

## WHAT IS CLAIMED IS:

- 1           1.     A method for increasing print job throughput in printer spooling  
2 arrangements, comprising:  
3                 receiving a print job having associated print data;  
4                 writing the print data to a storage device;  
5                 reading the print data from the storage device concurrently with the  
6 writing of the print data to the storage device; and  
7                 printing the print data read from the storage device.
- 1           2.     The method of Claim 1, wherein concurrently reading and writing the  
2 print data comprises reading the print data associated with the print job from the  
3 storage device as long as at least a portion of the print data associated with the print  
4 job is available on the storage device.
- 1           3.     The method of Claim 2, further comprising generating a message  
2 indicating that the print job is pending.
- 1           4.     The method of Claim 3, further comprising initiating the reading of the  
2 print data from the storage device in response to recognition of the message.
- 1           5.     The method of Claim 2, further comprising:  
2                 maintaining status attributes to identify a data file for the print job that  
3 has been created on the storage device to spool the print data, and to identify when  
4 at least a portion of the print data associated with the print job becomes available on  
5 the storage device.

1           6.     The method of Claim 5, further comprising:  
2                 monitoring the status attributes to determine when the print data  
3 associated with the print job becomes available on the storage device; and  
  
4                 initiating the reading of the print data from the storage device upon  
5 recognition of the status attributes indicating that at least a portion of the print data  
6 associated with the print job is available on the storage device.

1           7.     The method of Claim 1, further comprising suspending reading of the  
2 print data associated with the print job if the quantity of the print data written to the  
3 storage device is less than a predetermined number of bytes.

1           8.     The method of Claim 1, further comprising suspending reading of the  
2 print data associated with the print job when all of the print data written to the  
3 storage device has been read from the storage device but before the print data has  
4 been written to the storage device in its entirety.

1           9.     The method of Claim 8, further comprising generating an end of job  
2 indication when the print data has been written to the storage device in its entirety.

1           10.    The method of Claim 8, further comprising resuming reading of the  
2 print data when additional print data has been written to the storage device.

1           11.    The method of Claim 1, further comprising reading the print data from  
2 the storage device only after the writing of the print data has completed, if the print  
3 data is associated with predetermined one or more file types.

1           12.    The method of Claim 11, wherein the predetermined file types includes  
2 a PDF file type.

1           13.    The method of Claim 1, further comprising reading a number of bytes  
2 of the print data from the storage device that is above a number of bytes of the print  
3 data that has been written to the storage device.

1           14.    The method of Claim 1, further comprising updating despool  
2 availability status to identify the print data as available for reading from the storage  
3 device upon creation of a data file on the storage device to which the print data is  
4 directed.

1           15.    The method of Claim 14, further comprising monitoring the despool  
2 availability status to determine when to initiate the reading of the print data from the  
3 storage device.

1           16.    The method of Claim 15, wherein monitoring the despool availability  
2 status comprises monitoring the despool availability status using a back-end  
3 despooling daemon.

1           17.    The method of Claim 14, wherein updating the despool availability  
2 status comprises updating the despool availability status using a front-end spooling  
3 daemon.

1           18.    A printing device for processing print job requests, comprising:  
2                   at least one input channel to receive the print job requests;  
3                   a storage medium to store print data associated with the print job  
4 requests;  
5                   a spooling module coupled to receive the print job requests and  
6 associated print data, and to write the print data to the storage medium;  
7                   a despooling module to receive notification of an availability of the print  
8 data on the storage medium, and to concurrently read a first portion of the print data  
9 from the storage medium as a second portion of the print data is written to the  
10 storage medium; and  
11                  a print engine to print the print data read from the storage medium.

1           19.    The printing device of Claim 18, further comprising a job monitor  
2 module to maintain spooling status including an active spool indication to indicate  
3 that the print data is being written to the storage medium.

1           20.    The printing device of Claim 18, further comprising a job monitor  
2 module to maintain spooling status including a write count indication to indicate a  
3 number of bytes of the print data that has been written to the storage medium.

1           21.    The printing device of Claim 18, wherein the despooling module  
2 comprises means for reading the first portion of the print data that does not exceed  
3 the write count indication.

1           22.    The printing device of Claim 18, wherein the storage medium is a hard  
2 disk.

1           23.    The printing device of Claim 22, wherein the hard disk is formatted  
2 with a spooler directory to reserve storage for the print data associated with the print  
3 job requests.

1           24.    The printing device of Claim 22, wherein the hard disk is resident on  
2 the printing device.

1           25.    A print server system for processing print jobs, comprising:  
2                   one or more client systems arranged in a network to generate print  
3 jobs identifying print data for printing;  
4                   transmission media coupled to receive the print jobs and to transfer  
5 the print jobs initiated on the network;  
6                   a printing device coupled to the network via the transmission media to  
7 receive and process the print jobs, the printing device comprising:  
8                   a storage medium to store print data associated with the print  
9 jobs;  
10                  a spooling module coupled to receive the print jobs and  
11 associated print data, and to write the print data to the storage medium;  
12                  a despooling module to receive notification of an availability of  
13 the print data on the storage medium, and to concurrently read a first portion  
14 of the print data from the storage medium as a second portion of the print  
15 data is written to the storage medium; and  
16                  a print engine to print the print data read from the storage  
17 medium.

1           26.    The print server system of Claim 25, wherein the printing device  
2 comprises at least one input channel to receive the print job requests.

1           27.    The print server system of Claim 25, wherein the printing device further  
2 comprises a job monitor module to maintain spooling status including an active  
3 spool indication to indicate that the print data is being written to the storage medium.

1           28.    The print server system of Claim 25, wherein the printing device further  
2 comprises a job monitor module to maintain spooling status including a write count  
3 indication to indicate a number of bytes of the print data that has been written to the  
4 storage medium.

1           29.    The print server system of Claim 25, wherein the despooling module  
2 comprises means for reading the first portion of the print data that does not exceed  
3 the write count indication.

1           30.    A computer-readable program storage medium tangibly embodying a  
2 program of instructions executable by a printer system to process print jobs by  
3 performing steps comprising:

4                   receiving a print job having associated print data;  
5                   writing the print data to a storage device;  
6                   reading the print data from the storage device concurrently with the  
7 writing of the print data to the storage device; and  
8                   printing the print data read from the storage device.

1           31.    A method for concurrently spooling and despooling a print job to and  
2 from a storage device to increase printer throughput, comprising:

3                   creating a file on a storage device in which to store the print job;  
4                   writing print data associated with the print job to the storage device;  
5                   maintaining a status indicator indicating whether the print data is  
6 currently being written to the storage device;  
7                   monitoring the status indicator to determine if the print job is currently  
8 being written to the storage medium;  
9                   retrieving the print data associated with the print job from the storage  
10 medium concurrently with the writing of the print data to the storage medium,  
11 wherein the print data retrieved is the portion of the print data associated with the  
12 print job that has been written to the storage device; and  
13                   sending the retrieved print data associated with the print job to the  
14 printing device for printing.